

NATIONAL TRANSPORTATION SAFETY BOARD  
WASHINGTON, D. C.

STATEMENT OF THE  
NATIONAL TRANSPORTATION SAFETY BOARD  
BY THE  
HONORABLE JOHN H. REED, CHAIRMAN  
BEFORE THE  
SUBCOMMITTEE ON GOVERNMENT ACTIVITIES  
OF THE  
COMMITTEE ON GOVERNMENT OPERATIONS  
CONCERNING  
FAA DELEGATION OF AIRCRAFT CERTIFICATION RESPONSIBILITIES  
JUNE 13, 1973

Mr. Chairman and Members of the Subcommittee:

On behalf of the National Transportation Safety Board, I am pleased to have the opportunity to testify before this Committee on our views regarding Federal Aviation Administration delegation of aircraft certification responsibilities.

In order to put this subject into proper perspective I should point out that the certification process is only one facet of the total problem of producing a safe, serviceable aircraft. The production of a safe aircraft requires a combination of:

1. proper design regulations
2. a thorough certification program
3. proper manufacture of the aircraft

With respect to the first item - proper design regulations - it is fundamental that, with or without delegated option, the system is only as good as the basic design requirements upon which it is based.

The certification of the aircraft design, and the certification that the aircraft was produced in conformance with the design data is, in the case of many general aviation aircraft, delegated to the individual manufacturers of these aircraft. Various employees of these companies are then authorized to represent the FAA in the certification process.

Having set up this delegation system, FAA's role is then, according to our assessment of the situation, that of proper selection and indoctrination of these designees, and of monitoring of the system to assure that the designee performance meets FAA standards.

The three items previously mentioned are inseparable, and our investigations have led us into all areas. However, it is with the delegation system that we are primarily concerned today. Our broad overview of the delegation program, based upon our investigatory experience, leads the Board to conclude that the delegation concept is both partially responsible for, and made necessary by, our burgeoning general aviation industry. Without some delegation of certification responsibility, the economic growth and technical sophistication of the industry might well have been stifled by resource constraints upon the governmental organization charged with regulating the entire aviation industry. Thus, we believe that the delegation concept has merit, especially if the governing regulations are periodically reviewed and updated, as necessary, in light of advances in the state of the art and of the lessons learned from service and accident experience.

The safety problems involving delegation which have come to our attention have involved such isolated circumstances that, with one exception, it is difficult to apply any generalities to our findings. It is clear, however, that these problems have generally been related to the implementation, rather than the concept of the program.

Before discussing the nature of the problems we have observed in the delegated certification system, I might first explain our understanding of the processes by which airplanes are certificated. The type certification program is a means by which the design of a product such as a new aircraft is approved under the applicable airworthiness requirements. In the case

of our larger manufacturers of general aviation aircraft, the responsibility for establishing this certification of compliance is delegated to the manufacturer under the terms of the Delegation Option Authorization (DOA). Under these terms, certain personnel employed by the manufacturer are authorized to represent the FAA in determining the compliance of the product with the requirements of the Federal Aviation Regulations. A similar process is used in the case of Supplemental Type Certificates (STC's), which are issued in the case of major design changes to type certificated products when the change is not so extensive as to require a new type certificate. In either case, those designated to serve as representatives of the FAA are guided by the same requirements, instructions, procedures, and interpretations as FAA employees in the performance of these duties.

The DOA process of certificating an aircraft is monitored by the FAA, which conducts spot checks or audits of the organization, facilities, product, and certification records of those who hold such an authorization. In the case of STC's, the data submitted by Designated Engineering Representatives is subject to review by FAA. That material which is not reviewed by FAA is accepted as proper data by virtue of the authority granted the designee. In the case of either the DOA or the designated engineering representative, the amount of review of the final product is determined by FAA's assessment of the capabilities of those acting in its behalf.

As I noted earlier, specific problems involving implementation of the delegated option authority system, which have come to the attention of the NTSB as a result of our accident investigations, generally involve differences in the interpretation of specific responsibilities accorded to participants in the system.

An example of the apparent misunderstanding of responsibilities concomitant with the DOA system came to light during the investigation of an air taxi aircraft accident which occurred several years ago. The aircraft involved in this accident was a new type, designed specifically for air taxi operations. The design of the airplane incorporated a stabilizer trim system of a configuration not previously used by the manufacturer. This design eventually was determined to have been a factor in the accident. Under normal practice, the FAA may participate in the flight testing of certain components if it is determined that the associated design contains unique features with which the manufacturer has had little or no previous experience. However, in this instance, the Board determined that the FAA did not participate in the flight testing of this stabilizer. Had the FAA surveillance of the entire program been more extensive, the problems arising from this new feature might well have been detected and a more airworthy product would have been released to the public. This belief prompted our recommendation, in August 1970, that the FAA take action to require direct participation of FAA personnel in the certification of all newly designed aircraft components. The FAA reply to this recommendation indicated that they felt their current certification

procedures were adequate, and that, in practice, they do involve themselves in DOA programs whenever they believe it is necessary.

The delegation system has also encountered problems in connection with the STC process; again, the difficulties stem from a basic misunderstanding concerning areas of responsibility conferred by the system. The investigation of an accident involving a light twin-engine airplane which was extensively modified for air taxi use revealed some of the difficulties involving application of the delegation system to the STC process. The aircraft had been modified in accordance with engineering approved by an STC. Findings of the investigation indicated that the aircraft sustained an in-flight wing failure caused by the fatigue failure of a wing fitting. In reviewing the design of the STC modification, the Safety Board noted two errors which affected the fatigue life and load-carrying capability of the fitting. These errors might have been detected if the designated engineering representatives (DER) of the subcontractor responsible for the engineering of this alteration had been aware of specific responsibilities under the delegation system, which requires proper review of the design data and engineering drawings which a DER approves. However, the Board noted that the DER's involved were not fully aware of the responsibilities attendant to their designated status. The Chief Engineer of the engineering subcontractor, who functioned as a structures and flight test DER, testified that in one case his signature on technical data merely indicated that he had reviewed the data and thought it was a proper document. In arriving at this conclusion, he approved the general approach used in the calculations, but he did not

check the numerical accuracy. He felt that actual approval of the data was the responsibility of the FAA. He also noted that he initialed the drawing of the wing fitting as a DER, without checking it for material strength allowables. Another DER on this project testified that, with the exception of Type Certification Handbook 8110.4, he had not been provided guidance regarding his duties and responsibilities as a designee of the FAA.

Although the design errors which precipitated this accident may have been a direct result of the DER's lack of awareness of their responsibilities, the ultimate cause of the release of this unairworthy aircraft must be ascribed to the implementation of the program. In this respect, our probable cause of this accident noted, in part: "These deficiencies remained undetected because surveillance of the supplemental type certification process and the modification program was not adequate to assure compliance with design and inspection requirements."

As a result of its findings during this accident investigation, the Board recommended ". . . that the Federal Aviation Administration reevaluate its STC program to insure continuity in quality control in the supplemental type certification process." The FAA advised the Board that their investigation of the matter indicated that this was an isolated failure, and that further investigation of the STC program would not be productive in improving the airworthiness of aircraft subject to those requirements.

While discussing accidents involving aircraft modified by STC, I should also note that the proliferation of such modifications is a source of some concern to the Safety Board from a system safety viewpoint. We

believe that the basic safety afforded by the original type certification process may be derogated once the aircraft is modified by a number of STC changes.

Each individual STC may be technically correct as a discrete modification to an aircraft; however, several STC approved modifications applied to a single aircraft may cumulatively impair the technical soundness provided by the basic type certification process. The Board therefore believes that compatibility of multiple modifications to a basic aircraft must be demonstrated to insure the continued integrity of the aircraft as an airworthy system. This problem is illustrated by an accident involving an air taxi operator using an aircraft modified for that use. The investigation of that accident revealed that a poorly documented history of aircraft modifications and their cumulative effect on the aircraft eventually resulted in an unsafe condition of this aircraft under certain conditions of weight and balance. This condition proved to be a contributing factor to the accident.

Although such cases are relatively few in number, the causal area of an accident does occasionally involve the adequacy of the basic design requirements. The Board believes that such occurrences might indicate a need for FAA review of the means by which the Administration modifies its requirements in order to assure that (1) the regulations are modified in more timely fashion, and (2) that the requirements are kept up to the state of the art. In this respect, we see a possible need for reinstating

the Annual Airworthiness Review program which was discontinued shortly after formation of the FAA. That practice gave interested parties a forum in which to discuss, with government and industry, the philosophy of any specific regulatory provision, and to recommend and discuss specific changes to the requirements..

In citing the foregoing experiences in which the delegation system has not worked as intended, I do not wish to imply that this is the typical product of the system. We in the safety business tend to emphasize the few mistakes we find, rather than the more numerous instances in which the system performs properly. Also, the operation of the system is such that most of the mistakes which creep into the design, modification, or manufacture of an aircraft are apparently discovered during certification, or early in the service experience of the aircraft.

The FAA Service Difficulty Program is the mechanism by which the Administration attempts to detect and correct problems encountered with aircraft once they are in service. This program, which deals with every segment of aviation, provides for collection, dissemination, and analysis of data relating to service problems, and for issuance of corrective action. The functioning of the Service Difficulty Program appears to be generally adequate, since a relatively low percentage of the total number of AD's issued by the FAA result from accidents; most of the corrective actions initiated stem from FAA's routine surveillance programs and from information provided directly by manufacturers.

The NTSB, of course, has an important role in detecting service deficiencies through our investigations of accidents and incidents. Our

recommendations for corrective action have, over the years, been quite well received by the FAA, and we in the Board are gratified with the results attained by these recommendations. For example, approximately 57 percent of our 1971 recommendations to FAA were adopted, either totally or in part, about 32 percent are still pending, and the remaining 11 percent were rejected. Many of the rejections occurred because the final FAA assessment was that the recommended action could not be justified on a cost basis. The others were rejected because of honest differences of opinion on our respective approaches to solutions of safety problems.

In addition to believing that its recommendations for corrective action lead to improved safety on existing aircraft, the Board is convinced it also serves a useful function in the achievement of safety in the design of new aircraft. In this regard, the Board's publications of accident reports, safety studies and safety recommendations are used widely by aircraft designers who are seeking to profit by the experiences of others. Moreover, on a number of occasions, manufacturers have sent representatives to the Board's Washington headquarters for extended periods to review accident data in detail for information which would lead to better, safer aircraft designs.

In summary, Mr. Chairman, the Safety Board cannot fault the concept of delegated certification responsibility. The program has probably been a significant factor in the phenomenal growth of our national aerospace system, by enabling the industry to keep pace with product demand. It has also produced isolated failures. These, we believe, are largely due to

the manner in which the program was implemented in those specific cases. Those problems which we have attributed to the delegation program have generally been the result of a lack of FAA surveillance of the program. Such a program cannot consistently function as intended without rigorous governmental review. This is the primary area in which we see need for improvement.

The Board is aware that FAA is constantly attempting to upgrade the certification program. However, we do believe FAA should become more involved in the program -- perhaps in early auditing of the manufacturer's type certification process, or by developing some form of acceptance testing. While it is recognized that full participation by FAA in the manufacturer's flight test program would defeat the purpose of the DOA, the Board is of the opinion that FAA should consider involving itself in the flight test phase in the case of the sophisticated jet aircraft now being produced by some of the manufacturers. In the case of new designs intended for operation under the air taxi rules in Part 135, the Board believes that either DOA should not be permitted, or, some sort of FAA test/evaluation program should be devised in order to assure that these third level air carrier type aircraft have no unsafe design features.

That completes my statement, Gentlemen. If you have any questions, I will be happy to answer them.